CLAIMS

What is claimed is:

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- 1. A method for producing sophorolipids having spermicidal and/or antiviral properties comprising the steps of:
- a. synthesizing the sophorolipid by fermentation of *Candida bombicola* in a fermentation media to form a natural mixture of lactonic sophorolipids and non-lactonic sophorolipids;
 - b. utilizing the natural mixture as a spermicidal and/or antiviral agent;
- c. separating the lactonic sophorolipids from the natural mixture to form a lactonic fraction and mixing all remaining fractions to form a non-lactonic fraction;
- 9 d. utilizing the lactonic fraction as an spermicidal and/or antiviral agent; 10 and
- e. utilizing the non-lactonic fraction as a spermicidal and/or antiviral agent.
 - 2. A method for producing sophorolipids having spermicidal and/or antiviral properties comprising the steps of:
 - a. synthesizing the sophorolipid by fermentation of *Candida bombicola* in a fermentation media to form a natural mixture of lactonic sophorolipids and non-lactonic sophorolipids; and
 - b. utilizing the natural mixture as a spermicidal and/or antiviral agent.
 - 3. A method for producing sophorolipids having spermicidal and/or antiviral properties comprising the steps of:
 - a. synthesizing the sophorolipid by fermentation of *Candida bombicola* in a fermentation media to form a natural mixture of lactonic sophorolipids and non-lactonic sophorolipids;
 - b. separating the lactonic sophorolipids from the natural mixture to form a lactonic fraction and mixing all remaining fractions to form a non-lactonic fraction;
 and
 - c. utilizing the lactonic fraction as an spermicidal and/or antiviral agent.
 - 4. A method for producing sophorolipids having spermicidal and/or antiviral properties comprising the steps of:

3	a.	synthesizing the sophorolipid by fermentation of Candida bombicola in		
4	a fermentation media to form a natural mixture of lactonic sophorolipids and non-			
5	lactonic sor	lactonic sophorolipids;		
. 6	b.	separating the lactonic sophorolipids from the natural mixture to form a		
7	lactonic fra	ction and mixing all remaining fractions to form a non-lactonic fraction;		
8	and			
9	C.	utilizing the non-lactonic fraction as an spermicidal and/or antiviral		
10	agent.			
1	5.	The method as claimed in Claim 1, wherein the sophorolipid is 17-L-		
2	[(2´-O-β-D-	glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-octadecenoate based.		
1	6.	The method as claimed in Claim 5, wherein the 17-L-[(2´-O-β-D-		
2	glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-octadecenoate based sophorolipid is			
3	selected from the group consisting of 17-L-[(2´-O- β -D-glucopyranosyl- β -D-			
4	glucopyranosyl)-oxy]-cis-9-octadecenoate-6',6"-diacetate, Hexyl 17-L[(2'-O-β-D			
5	glucopyran	osyl-β-D-glucopyranosyl)-oxy]-cis-9-octadecenoate, and Ethyl 17-L[(2'-O-		
6	β -D glucopyranosyl- β -D-glucopyranosyl)-oxy]-cis-9-octadecenoate.			
1	7.	The method as claimed in Claim 2, wherein the sophorolipid is 17-L-		
2	[(2´-O-β-D-	glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-octadecenoate based.		
1	8.	The method as claimed in Claim 7, wherein the 17-L-[(2´-O-β-D-		
2	glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-octadecenoate based sophorolipid is			
3	selected from the group consisting of 17-L-[(2´-O-β-D-glucopyranosyl-β-D-			
4	glucopyran	glucopyranosyl)-oxy]-cis-9-octadecenoate-6',6"-diacetate, Hexyl 17-L[(2'-O-β-D		
5	glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-octadecenoate, and Ethyl 17-L[(2'-O			
6	β-D glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-octadecenoate.			
1	9.	The method as claimed in Claim 3, wherein the sophorolipid is 17-L-		
2	[(2'-O-β-D-glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-octadecenoate based.			
1	10.	The method as claimed in Claim 9, wherein the 17-L-[(2´-O-β-D-		
2	glucopyran	osyl-β-D-glucopyranosyl)-oxy]-cis-9-octadecenoate based sophorolipid is		

selected from the group consisting of 17-L-[(2´-O- β -D-glucopyranosyl- β -D-

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- 4 glucopyranosyl)-oxy]-cis-9-octadecenoate-6',6"-diacetate, Hexyl 17-L[(2'-O-β-D
- 5 glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-octadecenoate, and Ethyl 17-L[(2'-O-
- β-D glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-octadecenoate.
 - 11. The method as claimed in Claim 4, wherein the sophorolipid is 17-L- [(2´-O-β-D-glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-octadecenoate based.
- 1 12. The method as claimed in Claim 11, wherein the 17-L-[(2'-O-β-D-
- 2 glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-octadecenoate based sophorolipid is
- 3 selected from the group consisting of 17-L-[(2´-O-β-D-glucopyranosyl-β-D-
- 4 glucopyranosyl)-oxy]-cis-9-octadecenoate-6',6"-diacetate, Hexyl 17-L[(2'-O-β-D
- 5 glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-octadecenoate, and Ethyl 17-L[(2'-O-
- 6 β-D glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-octadecenoate.
 - 13. A method for inactivating spermatozoa using 17-L-[(2´-O-β-D-
- 2 glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-octadecenoate based sophorolipids.
- 1 14. The method as claimed in Claim 13, wherein the 17-L-[(2´-O-β-D-
- 2 glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-octadecenoate based sophorolipid is
- 3 selected from the group consisting of 17-L-[(2´-O-β-D-glucopyranosyl-β-D-
- 4 glucopyranosyl)-oxy]-cis-9-octadecenoate-6',6"-diacetate, Hexyl 17-L[(2'-O-β-D
- 5 glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-octadecenoate, and Ethyl 17-L[(2'-O-
- β-D glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-octadecenoate.
 - 15. A method for neutralizing or inactivating viruses using 17-L-[(2'-O-β-D-
- 2 glucopyranosyl-β-D-glucopyranosyl)-oxyl-cis-9-octadecenoate based sophorolipids.
- 16. The method as claimed in Claim 15, wherein the 17-L-[(2'-O-β-D-
- 2 glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-octadecenoate based sophorolipid is
- selected from the group consisting of 17-L- $[(2'-O-\beta-D-glucopyranosyl-\beta-D-glucopyranosyl-\beta-D-glucopyranosyl-\beta-D-glucopyranosyl-\beta-D-glucopyranosyl-\beta-D-glucopyranosyl-\beta-D-glucopyranosyl-\beta-D-glucopyranosyl-\beta-D-glucopyranosyl-β-D-glucopyranosyl$
- 4 glucopyranosyl)-oxy]-cis-9-octadecenoate-6',6"-diacetate, Hexyl 17-L[(2'-O-β-D
- 5 glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-octadecenoate, and Ethyl 17-L[(2'-O-
- β-D glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-octadecenoate.
- 1 17. A method for neutralizing or inactivating HIV using 17-L-[(2'-O-β-D-
- 2 glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-octadecenoate based sophorolipids.

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- The method as claimed in Claim 17, wherein the 17-L-[(2'-O-β-D-1 18. glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-octadecenoate based sophorolipid is 2 selected from the group consisting of 17-L-[(2'-O-β-D-glucopyranosyl-β-D-3 glucopyranosyl)-oxy]-cis-9-octadecenoate-6',6"-diacetate, Hexyl 17-L[(2'-O-β-D 4 glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-octadecenoate, and Ethyl 17-L[(2'-O-5 β-D glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-octadecenoate. 6 19. A sophorolipid compound having the formula 17-L-[(2'-O-β-D-1 qlucopyranosyl-β-D-glucopyranosyl)-oxyl-cis-9-octadecenoate-6',6"-diacetate. 2 The sophorolipid compound as claimed in Claim 19 having spermicidal 20. 1 2 properties. The sophorolipid compound as claimed in Claim 19 having antiviral 1 . 21. 2 properties.
- 22. A sophorolipid compound having the formula Ethyl 17-L-[(2´-O-β-D-glucopyranosyl)-oxy]-cis-9-octadecenoate.
- 1 23. The sophorolipid compound as claimed in Claim 22 having spermicidal properties.
- 1 24. The sophorolipid compound as claimed in Claim 22 having antiviral properties.
 - 25. A sophorolipid compound having the formula Hexyl 17-L-[(2΄-O-β-D-glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-octadecenoate.
 - 26. The sophorolipid compound as claimed in Claim 25 having spermicidal properties.
 - 27. The sophorolipid compound as claimed in Claim 25 having anti-viral properties.
 - 28. The method as claimed in Claim 1, wherein the sophorolipid compound is delivered in a form selected from the group consisting of a gel, a film, a foam, a suppository, a pessary, a liposomic formulation, and as a liquid imbibed in a sponge.
- 1 29. The method as claimed in Claim 2, wherein the sophorolipid compound 2 is delivered in a form selected from the group consisting of a gel, a film, a foam, a 3 suppository, a pessary, a liposomic formulation, and as a liquid imbibed in a sponge.

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- 30. The method as claimed in Claim 3, wherein the sophorolipid compound is delivered in a form selected from the group consisting of a gel, a film, a foam, a suppository, a pessary, a liposomic formulation, and as a liquid imbibed in a sponge.
- 31. The method as claimed in Claim 4, wherein the sophorolipid compound is delivered in a form selected from the group consisting of a gel, a film, a foam, a suppository, a pessary, a liposomic formulation, as a liquid imbibed in a sponge, and as a liquid being released from an intravaginal or intrauterine delivery system.
- 32. The sophorolipid compound as claimed in Claim 19, wherein the sophorolipid compound is in a form selected from the group consisting of a gel, a film, a foam, a suppository, a pessary, a liposomic formulation, as a liquid imbibed in a sponge, and as a liquid being released from an intravaginal or intrauterine delivery system.
- 33. The sophorolipid compound as claimed in Claim 20, wherein the sophorolipid compound is delivered in a form selected from the group consisting of a gel, a film, a foam, a suppository, and a pessary.
- 34. The sophorolipid compound as claimed in Claim 21, wherein the sophorolipid compound is delivered in a form selected from the group consisting of a liposomic formulation, as a liquid imbibed in a sponge, and as a liquid being released from an intravaginal or intrauterine delivery system.
- 35. The sophorolipid compound as claimed in Claim 23, wherein the sophorolipid compound is delivered in a form selected from the group consisting of a gel, a film, a foam, a suppository, and a pessary.
- 36. The sophorolipid compound as claimed in Claim 24, wherein the sophorolipid compound is delivered in a form selected from the group consisting of a liposomic formulation, as a liquid imbibed in a sponge, and as a liquid being released from an intravaginal or intrauterine delivery system.
- 37. The sophorolipid compound as claimed in Claim 26, wherein the sophorolipid compound is delivered in a form selected from the group consisting of a gel, a film, a foam, a suppository, and a pessary.
- 38. The sophorolipid compound as claimed in Claim 27, wherein the sophorolipid compound is delivered in a form selected from the group consisting of a

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- liposomic formulation, as a liquid imbibed in a sponge, and as a liquid being released 3 4 from an intravaginal or intrauterine delivery system.
 - 39. The application of a sophorolipid synthesized by fermentation of Candida bombicola in a fermentation media to form a natural mixture of lactonic sophorolipids and non-lactonic sophorolipids in combination with at least one sophorolipid selected from the group consisting of:
- 17-L-[(2'-O-β-D-glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-5 a. 6 octadecenoate-6',6"-diacetate;
- Ethyl 17-L-[(2'-O-β-D-glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-7 b. 8 octadecenoate;
 - Hexyl 17-L-[(2'-O-β-D-glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-C. octadecenoate: and
- combinations thereof, 11 d.
- 12 as antiviral agents.
- The application of a sophorolipid synthesized by fermentation of 1 40. Candida bombicola in a fermentation media to form a natural mixture of lactonic 2 sophorolipids and non-lactonic sophorolipids in combination with at least one 3 4 sophorolipid selected from the group consisting of:
- a. 17-L-[(2'-O-β-D-glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-5 octadecenoate-6',6"-diacetate; 6
- Ethyl 17-L-[(2'-O-β-D-glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-7 b. octadecenoate; 8
- 9 Hexyl 17-L-[(2´-O-β-D-glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-C. 10 octadecenoate; and
- d. combinations thereof, 11
- 12 as spermicidal agents.
- 41. The application of the sophorolipid as claimed in Claim 19 in combination with at least one sophorolipid selected from the group consisting of: 2

3	a.	Sophorolipids synthesized by fermentation of Candida bombicola in a
4		fermentation media to form a natural mixture of lactonic sophorolipids
5		and non-lactonic sophorolipids;
6	b.	Ethyl 17-L-[(2´-O-β-D-glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-
7		octadecenoate;
8	C.	Hexyl 17-L-[(2´-O-β-D-glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-
9		octadecenoate; and
10	d.	combinations thereof,
11	as antiviral agents.	
1	42.	The application of the sophorolipid as claimed in Claim 19 in
2	combination with at least one sophorolipid selected from the group consisting of:	
3	a.	Sophorolipid synthesized by fermentation of Candida bombicola in a
4		fermentation media to form a natural mixture of lactonic sophorolipids
5		and non-lactonic sophorolipids;
6	b.	Ethyl 17-L-[(2´-O-β-D-glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-
7		octadecenoate;
8	C.	Hexyl 17-L-[(2´-O-β-D-glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9
9		octadecenoate; and
10	d.	combinations thereof,
11	as spermicidal agents.	
1	43.	The application of the sophorolipid as claimed in Claim 22 in
2	combination with at least one sophorolipid selected from the group consisting of:	
3	a.	Sophorolipid synthesized by fermentation of Candida bombicola in a
4		fermentation media to form a natural mixture of lactonic sophorolipids
5		and non-lactonic sophorolipids;
6	b.	17-L-[(2´-O-β-D-glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-
7		octadecenoate-6',6"-diacetate;
8	C.	Hexyl 17-L-[(2´-O-β-D-glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9
9		octadecenoate; and
10	d.	combinations thereof,

11	as antiviral agents.			
1	44.	The application of the sophorolipid as claimed in Claim 22 in		
2	combination	combination with at least one sophorolipid selected from the group consisting of:		
3	a.	Sophorolipid synthesized by fermentation of Candida bombicola in a		
4		fermentation media to form a natural mixture of lactonic sophorolipids		
5		and non-lactonic sophorolipids;		
6	b.	17-L-[(2´-O-β-D-glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-		
7		octadecenoate-6',6"-diacetate;		
8	C.	Hexyl 17-L-[(2´-O-β-D-glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9		
9		octadecenoate; and		
10	d.	combinations thereof,		
11	as spermicidal agents.			
1	45.	The application of the sophorolipid as claimed in Claim 25 in		
2	combination with at least one sophorolipid selected from the group consisting of:			
3	a.	Sophorolipid synthesized by fermentation of Candida bombicola in a		
4		fermentation media to form a natural mixture of lactonic sophorolipids		
5		and non-lactonic sophorolipids;		
6	b.	17-L-[(2´-O-β-D-glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-		
7		octadecenoate-6',6"-diacetate;		
8	C.	Ethyl 17-L-[(2´-O-β-D-glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-		
9		octadecenoate; and		
10	d.	combinations thereof,		
11	as antiviral agents.			
1	46.	The application of the sophorolipid as claimed in Claim 25 in		
2	combination with at least one sophorolipid selected from the group consisting of:			
3	a.	Sophorolipid synthesized by fermentation of Candida bombicola in a		
4		fermentation media to form a natural mixture of lactonic sophorolipids		
5		and non-lactonic sophorolipids;		
6	b.	17-L-[(2´-O-β-D-glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-		

octadecenoate-6',6"-diacetate;

8	C.	Ethyl 17-L-[(2´-O-β-D-glucopyranosyl-β-D-glucopyranosyl)-oxy]-cis-9-	
9		octadecenoate; and	
10	d.	combinations thereof,	
11	as spermicidal agents.		
1	47.	The application of the sophorolipids as claimed in Claim 1 in	
2	combination with known antiviral agents.		
1	48.	The application of the sophorolipids as claimed in Claim 1 in	
2	combination with known spermicidal agents.		
1	49.	The application of the sophorolipids as claimed in Claim 17 in	
2	combination with known antiviral agents.		
1	50.	The application of the sophorolipids as claimed in Claim 17 in	
2	combination with known spermicidal agents.		
1	51.	The application of the sophorolipids as claimed in Claim 20 in	
2	combination with known antiviral agents.		
1	52.	The application of the sophorolipids as claimed in Claim 21 in	
2	combination with known spermicidal agents.		
1	53.	The application of the sophorolipids as claimed in Claim 23 in	
2	combination	with known antiviral agents.	
1	54.	The application of the sophorolipids as claimed in Claim 24 in	
2	combination	with known spermicidal agents.	